CLAIMS

1. Elementary analysis device by optical emission spectrometry on laser produced plasma, this device being characterized in that it comprises:

- a pulsed laser source (6)
- a diaphragm (8) usable for selecting part of the laser beam emitted by the source, and possibly delimiting the shape of the impact of the laser beam on an object to be analysed (2), this laser beam not being focused in the plane of the diaphragm,
- first optical means (10) capable of projecting the image of the diaphragm to infinity,
- second optical means (12) designed to receive the image of the diaphragm projected to infinity by the first optical means and focusing it on the object to be analysed to produce plasma (28) on the surface of this object, the assembly formed by the diaphragm and the first and second optical means also satisfying the following conditions:

v the image of the diaphragm focused on the object is equal to the required dimension on this object

v the focal point of the laser beam, after crossing through the diaphragm and the first and second optical means, is outside the image plane of the diaphragm,

- means (16, 18) of analysing a light radiation spectrum emitted by the plasma, and

- means (20) of determining the elementary composition of the object starting from this spectrum analysis.

2. Device according to claim 1, in which the second optical means (12) have a digital aperture equal to approximately 0.1 or greater.

3. Device according to either of claims 1 and 2, in which the impact size of the laser beam on the object is greater than or equal to 1 μm.

4. Device according to any one of claims 1 to 3, in which the displacement frequency of the object (2) between two laser pulses of the source (6) is greater than or equal to 15 Hz.

5. Device according to any one of claims 1 to 4, in which the source (6) is capable of emitting ultraviolet light.

6. Device according to any one of claims 1 to 5, in which the relative variation of energy between 1 laser pulse and the next does not exceed 5%.

7. Device according to any one of claims 1 to 6, in which the diaphragm (8) comprises a circular aperture capable of selecting the central part of the laser beam output from the laser source, the first optical means are refractive optical means, and the

Sub A2 (Contd)

second optical means are refractive optical means comprising a microscope objective (12).

Sub B7

8. Device according to claim 7, in which the first and second optical means (10, 12) are anti-reflection treated for reflections at the wavelength of the light emitted by the laser source (6).

9. Device according to any one of claims 1 to 8, also comprising means (38) of blowing a gas jet onto the object (2).

Sub A3

10. Device according to any one of claims 1 to 9, also comprising:

- means (32) of observing the object, so that the object can be placed in the image plane of the diaphragm and

- a mirror (26) reflecting at the wavelength of the laser source and transparent at other wavelengths, this mirror being placed on the light path between the first and second optical means and designed to reflect almost the entire laser beam to these second optical means and to transmit an image of the object to the observation means

ADD A4

add B10